

Spot Safety Project Evaluation

Project Log # 200512163

Spot Safety Project # 04-96-235

**Spot Safety Project Evaluation of the Actuated Signal Installation at SR 1004 (W. Main St.)
and SR 1552 (Robertson St.) in Johnston County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Samuel D. Coleman, EI

Traffic Safety Project Engineer

12/12/06
Date

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 04-96-235 – Actuated Signal Installation at SR 1004 (W. Main St.) and SR 1552 (Robertson St.) in Johnston County.

Project Information and Background from the Project File Folder

SR 1004 (W. Main St.) was a two lane facility with a speed limit of 35 mph toward Mulberry Street (west leg) and 25 mph toward Ellington Street (east leg). SR 1552 (Robertson St) is a two lane facility with a speed limit of 35 mph. The intersection was controlled by a stop condition on SR 1552.

The problem statement was that increasing traffic coupled with restricted sight distance resulted in poor gap selection when trying to cross SR 1004. A crash study was completed for the intersection from January 1, 1993 through December 31, 1995. A total of 12 crashes occurred at this location; there were 3 Angle, 3 Left Turn, 3 Backing, and 3 other random crashes. The decision was made to install a traffic signal to minimize crash potential. The final completion date for the improvement at the subject location was on June 10, 1997 at a cost of \$35,000.

Please note, during the site visit there were existing left turn lanes on Main Street. There is no information in the project background folder showing the installation date. From the police crash report diagrams the installation date was estimated to be about the same time as the signal installation.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes along the subject road, the crash data omitted from this analysis to consider for an adequate construction period was from May 1997 through July 1997. The before period consisted of reported crashes from January 1, 1990 through April 30, 1997 (7 years, 4 Months) and the after period consisted of reported crashes from August 1, 1997 through November 30, 2004 (7 Years, 4 Months). The ending date for this analysis was limited by the available crash data in the before period.

The treatment data consisted of all crashes within 150 feet of the subject intersection on all four legs. The following data table depicts the Naive Before and After Analysis for the above information. Please note that Frontal Impact crash types were the target crashes for the applied countermeasure. These crash types considered are as follows: Left Turn, same roadway; Left Turn, different roadway; Right Turn, same roadway; Right Turn, different roadway; Head On and Angle.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total Crashes	30	18	-40.0
Total Severity Index	11.0	3.5	-68.6
Frontal Impact Crashes	18	13	-27.8
Frontal Severity Index	8.1	3.8	-52.5
Volume	8700	11150	28.2
<u>Treatment Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	3	0	-100.0
Class B	1	0	-100.0
Class C	9	6	-33.3
Property Damage Only	17	12	-29.4
<u>Frontal Injury Crashes</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Fatal	0	0	N/A
Class A	1	0	-100.0
Class B	1	0	-100.0
Class C	6	5	-16.7
Property Damage Only	10	8	-20.0

Table 1.

The naive before and after analysis at the treatment location resulted in a 40 percent decrease in Total Crashes, a 28 percent decrease in Frontal Impact Crashes, and a 28 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1993 and the after period ADT year was 2001.

Results and Discussion

The naïve before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 40 percent decrease in Total Crashes and a 28 percent decrease in Frontal Impact Crashes. The summary results above demonstrate that the treatment location appears to have had a decrease in the number of Total Crashes and a decrease in the number of Frontal Impact Crashes from the before to the after period.

During the site visit the only issue noted was a crest vertical curve at the intersection on SR 1004. Both the east (4%) and west (1%) legs have a downgrade away from the intersection. There is also a downgrade on SR 1552 from north to south. For vehicles crossing SR 1004 sight distance may have been an issue in the before period. It also seems vehicles may have had trouble recognizing the stop condition when approaching from the north. During the before period, the two backing crashes (crashes 20 and 21) may have been from vehicles stopping too late and having to back up to get out of the intersection.

Referencing the before and after collision diagrams, left turning vehicles on SR 1004 may have difficulty finding suitable gaps in traffic for safe movement. The pattern still remains for vehicles turning left from eastbound SR 1004 in the after period. In the after period, there are 6 crashes for the eastbound left turning movement, which is 33% of the total crashes. During the field investigation, a protected left turn signal was in place for the westbound left turning vehicles. A protected left turn signal may prove beneficial for the eastbound leg as well.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of road.

Treatment Site Photos taken October 6, 2006



On SR 1004 facing east



On SR 1552 facing north



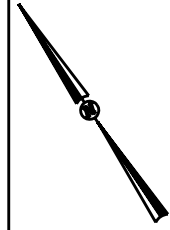
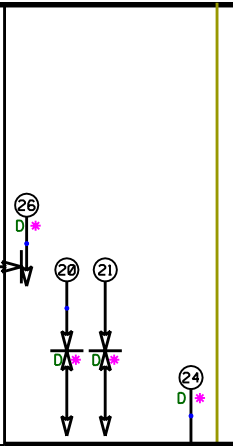
On SR 1004 facing west



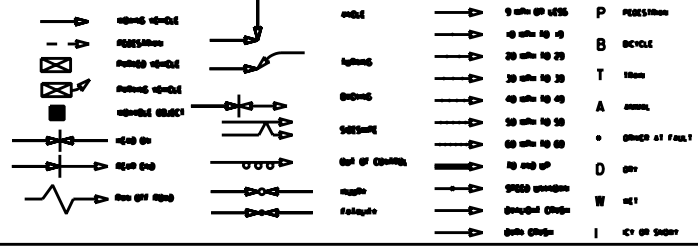
On SR 1552 facing south

Johnston County
Treatment Site - Total Crashes
Before Period
January 1, 1990 - April 30, 1997
(7 years 4 months)

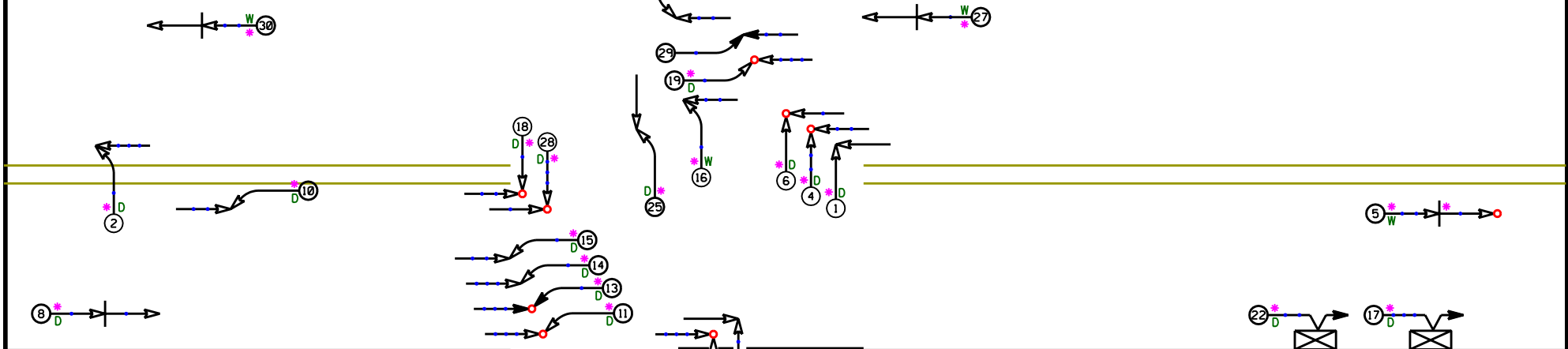
SR 1004 (W Main St)
35 MPH



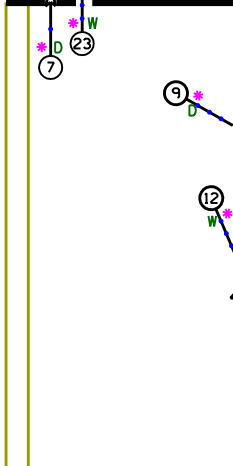
LEGEND



SR 1004 (W Main St)
25 MPH

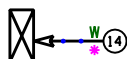


























SR 1552 (Robertson St)
35 MPH



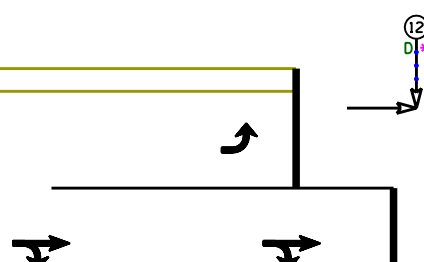
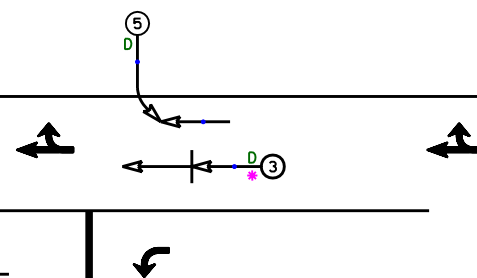
TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT <small>HIGHWAY SAFETY IMPROVEMENT PROGRAM SAFETY RECOGNITION MANAGEMENT AND SUPPORT</small>		COLLISION DIAGRAM	
	STUDY PERIOD: 1/1/1990 TO 4/30/1997	AREA:	DATE:
	DISTANCE: 1+1/2 MILES (0.75)	ANALYSIS PREPARED BY: S. COMPTON	DATE: AUGUST 2000
	DIAGRAM PREPARED BY: S. COMPTON	DATE:	SCALE: NOT TO SCALE
	DIAGRAM REVIEWED BY:	DATE:	SCALE:
	RECOMMENDATIONS:		
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

SR 1004 (W Main St)
35 MPH



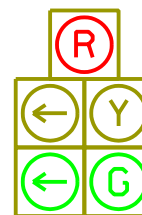
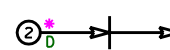
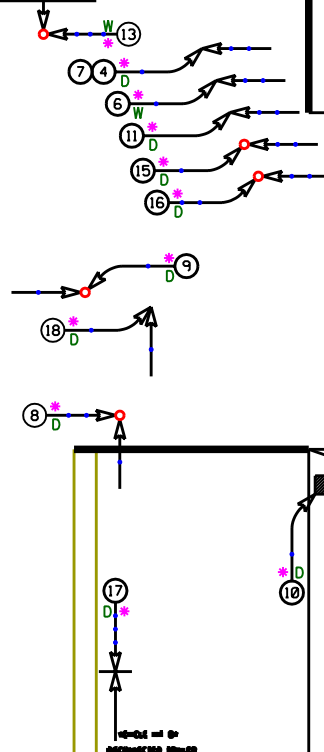
	right arrow		right		9 min 00 00	P	PERMISSION
	left arrow		right		10 min 00 00	B	BICYCLE
	box with X		right		20 min 00 00	T	THAN
	box with X and arrow		right		30 min 00 00	A	ARMED
	black square		right		40 min 00 00	0	0 (ZERO) at 00:00
	two arrows pointing left		right		50 min 00 00	D	DAY
	two arrows pointing right		right		60 min 00 00	W	WILL
	wavy line		right		70 min 00 00	I	ICU ON SUNDAY

SR 1004 (W Main St)
25 MPH



Signalized/
Intersection

SR 1552 (Robertson St)
35 MPH



(East Leg
of Main St.)

